Testimony of John P. Morgridge
Chairman of the Board
Cisco Systems, Inc.
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"U.S. Competitiveness: The Innovation Challenge"
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Thank you, Chairman Boehlert, for inviting me to testify today, and I would also like to thank Ranking Member Gordon and the other members of the Committee for holding and participating in this important hearing on the innovation challenge for U.S. competitiveness.

I am John Morgridge, Chairman of the Board of Cisco Systems, the worldwide leader in networking for the Internet. This year, Cisco celebrates 20 years of commitment to technology innovation, industry leadership and corporate social responsibility and I am honored to offer this testimony on innovation and U.S. competitiveness before this committee.

Today's hearing comes at an important and challenging time for our country. It is becoming very clear that the United States can no longer take for granted our place as the global economic, technology, and innovation leader. There is much that government and industry can do to address this challenge, but we cannot be complacent in our response. We must recognize the challenge and take it head on if we hope to be successful.

I will focus on three areas today. The first area, and in my mind, the most important to ensure global competitiveness and continued innovation is a sound education system, including sufficient basic research and development funding as well as a focus on science and math. The second area is having the appropriate physical infrastructure necessary to support the innovation ecosystem, namely, and most specifically, having real, ubiquitous broadband available to all Americans - whether wireline or wireless. Last, we must foster innovation by having a proper legal and policy framework, particularly in the areas of intellectual property and security.

I. IMPORTANCE OF EDUCATION TO INNOVATION AND U.S. COMPETITIVENESS

Education is the foundation to all innovation and the engine to economic growth. We must advocate policies that will create an educated workforce to match America's future employment needs, specifically an educated workforce trained in math and science which is critical to the innovation economy. In order for America's high tech industry to stay

competitive throughout the 21st Century and beyond, we need to invest in our workforce of tomorrow by giving them the tools necessary to compete for post-secondary education programs or careers in science, math or engineering. We need to make America's educational system the best in the world by making math and science teaching a priority for our children and support efforts on the state and federal levels to accomplish this objective. I applaud what this Committee has done to recognize the finest math and science teachers in this country – their work is vital to our future competitiveness.

A domestic workforce educated in science, math or engineering will ensure that the American high tech industry continues to lead the world in terms of innovation and entrepreneurship. Moreover, an educated workforce will enable Cisco and other job producing innovative companies to meet our human resource needs by attracting domestic talent, unencumbered by immigration restrictions.

Unfortunately, America's children are not receiving the necessary training in math and science to compete for high-paying technology jobs of the future. For example, only 24 states require secondary students to take at least three years of math, and only 21 states require students to take at least three years of science.

Because math and science education is lacking, young Americans will miss out on job opportunities, or will lack the necessary skills for post-secondary study. Nationally, out of one-hundred ninth-graders, only 67 will graduate from high school on time, only 38 will directly enter college, only 26 are still enrolled their sophomore year, and only 18 will end up graduating from college. U.S. 12th graders performed among the lowest of the 21 countries assessed in both math and science on the Third International Mathematics and Science Study.

Improving education worldwide is a top goal of Cisco Systems, Inc. Since 1997, the Cisco Networking Academy Program has leveraged the internet to improve education around the world. The Cisco Networking Academy Program has enabled Cisco to facilitate public and private partnerships for education and become a leading innovator in e-learning. Since its inception, over 1.6 Million students have enrolled at more than 10,000 Academies located in high schools, technical schools, colleges, universities, and community-based organizations in over 150 countries. For more information on this program, please visit: www.cisco.com/go/netacad.

We have to be innovative in our approach to education. We are in the 21st century and must use the tools and methods of today to train our future workforce. With an e-learning model such as the Cisco Network Academy Program we have learned that curriculum can be altered based on how well students are performing on the tests based on that curriculum. We have also found that students in East Palo Alto, California, an underprivileged area, perform as well as the richest school districts in America. Given the opportunity and the tools, students can perform and become excited about technology. Students in the Chairman's district are currently becoming certified as Cisco Network Associates at SUNY Institute of Technology and Mohawk Valley Community College, as

well as at Broome-Tioga Board of Cooperative Educational Services, serving 15 school districts in Broome and Tioga counties.

Additionally, Cisco has helped develop a pilot program in the Hashemite Kingdom of Jordan to deliver math and science curriculum via the Internet. Partnering with the government of Jordan, the World Economic Forum, U.S. Agency for International Development (USAID), and many other corporate partners, the Jordan Education Initiative (JEI) is using the internet to deliver curriculum of math, Information and Communication Technology (ICT), Arabic and Science (January 2005). Taking the knowledge from this pilot program, we hope to expand to other nations and bring this method of curriculum delivery to the United States as well.

Cisco supports increasing innovation in public schools, establishing high standards, promoting the use of education technology in the classroom and ensuring accountability of schools, teachers, districts and programs. We also support efforts to ensure that all children — and all Americans — share in the information age through access to technology and its benefits. However, we also need to put a renewed focus on math and science in the schools, much like in the 1960's, so that it is the United States producing the innovative technologies and the job centers of tomorrow, rather then our counterparts in Europe or Asia.

The positive impact that foreign-born students have had on our innovation economy can not be discounted. We clearly want to have U.S. students studying and excelling at the masters and Ph.D. levels in math, science and engineering, but we also must continue to attract the best and the brightest from around the world to our universities and encourage them to stay in the U.S. after their studies. Foreign-born math, science and engineering students have been and continue to be a boon to our economy and we should support their continued success in academia and industry in this nation.

Recognizing the technology industry's responsibility to contribute to an improved education system, TechNet has established an Education Task Force to develop a new private-sector initiative to increase America's math, science and engineering talent. TechNet is a technology policy trade association of CEO's of which Cisco is a founder and active member. The Task Force will examine science and math preparedness in primary and secondary education as well as barriers to science and engineering degree attainment in postsecondary and graduate education. One of the goals of the Task Force is to impact the goal of doubling the number of STEM (Science, Technology, Engineering and Math) majors by 2015. I serve on this Task Force and we will be offering our full report this fall.

Last, but certainly not least, in order to stimulate high-tech research and give companies certainty, the R&D tax credit should be updated and expanded to maximize its impact in incentivizing companies to conduct R&D in the United States. Additionally, funding should be increased for basic R&D at government, university and private labs. It pleases me to no end that Chairman Boehlert is a self-professed "unabashed cheerleader" for the

National Science Foundation (NSF) and hope that the increased funding for the NSF he and his colleagues were able to get this year will be built upon.

The House Science Committee, with its deep understanding of the importance of math and science to our overall standing in the world, should continue to use its leadership role, with hearings such as this one, to bring attention to this vital area for U.S. competitiveness and innovation and press for increased funding for math and science education, basic R&D and the National Science Foundation.

II. APPROPRIATE PHYSICAL INFRASTRUCTURE FOR INNOVATION

Broadband Deployment

The Internet, as we know it, was developed with government funds under the direction of the U.S. Advanced Research Projects Agency and, in 1969, became a reality with the interconnection of four university computers. From those humble beginnings, the internet has now become the basis for efficiencies and productivity never thought possible.

Broadband is always-on, high-speed connectivity to the internet and it is the foundation of all future information connectivity. Its import to innovation, collaboration and a nation's overall competitiveness cannot be understated. The deployment of broadband infrastructure is a key measure of success for a country and is crucial to the future growth of the innovation economy. I applaud President Bush's stated goal of having universal broadband connectivity in the United States by 2007 and we are looking forward to the FCC's leadership to making this goal a reality.

Although a few countries such as Korea and Japan have achieved significant broadband penetration, most countries lag far behind. The United States has fallen from 4th to 16th in broadband penetration and stands to fall even further. Moreover, with few exceptions, most of the broadband infrastructure available today consists of relative slow connections in the 500kpbs to 3Mbps range, not in the 10Mbps to 100Mbps that will needed to support the development of future innovative applications.

Because telecommunications is one of the most intensely regulated industries and has a legacy of decades of government involvement, regulatory policy significantly affects broadband infrastructure investment. Regulators and government can affect investment in myriad ways, some negative and some positive: through the application of legacy regulation to new technologies, through attempts to artificially create competition, through spectrum allocation, through subsidy systems, and through direct government investment and tax incentives.

Cisco believes that deployment of next generation broadband infrastructure should take priority over most competing interests when deciding regulatory policy. In Cisco's opinion, any national broadband plan should include policies to:

- Incent private sector investment in broadband infrastructure

- Promote market-driven deployment of new technologies and applications
- Encourage innovation and entrepreneurship through clear, concise, minimally intrusive rules that create as much market certainty as is possible
- Make spectrum available for wireless broadband services

Key regulatory policies to implement these goals include removing regulatory requirements to unbundle new networks and new infrastructure investment; keeping onerous telecommunications regulation from being imposed on competitive broadband providers such as cable, wireless, and powerline; avoiding legacy regulation being imposed on new technologies and applications such as VoIP, IP video, and other Internet applications; ensuring sufficient spectrum for high speed broadband access applications; and migrating programs to support infrastructure investment in low density rural areas from a traditional circuit switched voice focus to broadband connectivity.

Digital Television Transition

In order for additional wireless spectrum to be made available for public safety uses, as well as to bring broadband to rural and underserved areas in the nation, Cisco has advocated a "date certain" to end analog television broadcasting in the 700 MHz band in the U.S.

Current federal law provides that analog television broadcasting will cease by the end of 2006 or when 85 percent of households can receive digital TV signals. It is clear that the 2006 date will not be met, given projected market conditions. Key officials at the FCC, and in the U.S. House of Representatives, have indicated an interest in selecting a date certain of no later than January 1, 2009, and Cisco, along with other high technology companies, including consumer electronics companies, rural interests, and the public safety community, are urging policymakers to adopt a hard date. Once the transition is complete, 24 MHz of spectrum will be turned over to public safety licensees, and the lion's share would be devoted to commercial wireless service, including broadband access, as the directed by Congress.

Cisco has no "technology religion" with respect to licensed wireless broadband technology. Cisco is a member of the WiMax interoperability forum, and has also closely followed developments around the 802.20 standard, but we believe it is the market that will best decide what technologies will flourish. As fits our overall philosophy, we do not believe that the government should pick technology winners or losers.

The basic benefits that will be available to the American public as soon as broadcasters give back their second channel will be numerous. According to the Information Technology Industry Council (ITI), of which Cisco is an active member, benefits will include:

1. **Public Safety** - On 9/11 and every day across the country, first responders from police and fire departments cannot speak to each other because their radios

operate on different frequencies. The 9/11 Commission Report recommended in 2004 that Congress approve legislation to clear these channels for public safety. Congress was aware of this problem in 1997 and designated more spectrum for use by first responders, but it can't take effect until broadcasters release their currently held spectrum.

2. **Rural Broadband** - Rural areas are one of the major parts of the country that still lack high-speed broadband internet access. Using the additional spectrum, companies would be able to offer wireless broadband to areas that are not served by current broadband technologies.
3. **Economic Growth** - A definitive digital TV transition date would give high-tech companies enough certainty to invest R&D into innovative wireless broadband networks for use in the newly available spectrum. That would in turn spark growth in the U.S. high-tech sector, provide new high-quality jobs for American workers, and add to the global competitiveness of U.S. technology.
4. **Telecom Competition** - Today, consumers receive most of their telecommunications services – phone, television, and Internet service – through either their phone line or their cable line. Because spectrum in the 700 megahertz band is of high quality and capable of advanced uses, it could one day become a "third pipe" into consumers' homes that could provide phone, television and Internet services, which would have the effect of increasing competition and reducing prices for consumers.

III. PROPER LEGAL AND POLICY FRAMEWORK FOR INNOVATION

Patent Reform

Patents ensure that inventors have the incentive to invest in further innovation, while at the same time promoting public access to new inventions. The threat of patent litigation, however, is becoming a drag on innovation while the current patent system is creating incentives for frivolous litigation. Legislation is necessary to reduce the disruptions caused by litigation and improve the quality of patents.

Certain factors in the current patent system have resulted in disruptions for Cisco and other leading innovation companies. First, the playing field in the patent legal system has become increasingly tilted towards plaintiffs, making even weak claims problematic for litigation targets. Second, the U.S. Patent and Trademark Office (PTO) is currently overburdened and lacks procedures necessary to avoid issuing poor quality patents on which plaintiffs can stake a claim. Third, some opportunistic individuals are buying up patents to use as offensive litigation tools. These so-called "patent trolls" accumulate patent portfolios not to further innovation and development of new products, but to compel others to license technologies from them under threat of litigation. In many instances, these patents are used for strictly tactical purposes, never intended for commercialization of inventions.

Cisco supports efforts to pass common sense patent reform legislation to reduce the disruptions caused by litigation and improve the quality of patents. We are working with other companies and industry groups to craft legislative recommendations to address this issue.

Intellectual Property

At Cisco, we believe our most important assets walk out the door every night. However, as we produce and own intellectual property and understand the vital importance of intellectual property to business development, strong intellectual property protection is necessary. Mandatory or legislated standards are not the answer, however. Technical standards developed and mandated by the government would freeze technological innovation and hurt development of digital technologies. This concept is true for digital rights management, security and other issues where some have asked government to step in and mandate a solution. If history and Moore's Law are any indicators, by the time a technology industry standard is developed and adopted, there is usually one in the pipeline that is better and in the marketplace eighteen months later.

The most effective role of government is to ensure adherence to existing laws and enforce penalties against transgressors.

Security

We all recognize how important security is to our economy, national security, and national competitiveness. Over the years, this committee has been a leader in promoting cyber security research and development, including it's authorship of the 2002 *Cyber Security Research and Development Act* (P.L. 107-305), which brought an important focus to the benefits from additional basic cyber security research at the NSF and the ongoing security work at the National Institute of Standards and Technology. The proper policy framework is also vitally important for continued advances in security.

Innovation sits at the heart of the security challenge. There is tremendous innovation in security technologies. Information security systems are moving from passive to active, and from point products to self defending networks using an adaptive, and interconnected, architecture-based approach. We will enhance security through innovation and effective law enforcement. As the nature of security continues to change, public policy has to continue recognize the centrality of innovation, and continue to avoid technology mandates or regulation, which at the end of the day will always trail innovation, and make us less, not more, secure.

CONCLUSION

In summary, there is a lot that the government can be doing to focus on innovation and our national overall competitiveness.

In order to innovate and remain competitive in the increasingly global marketplace we must have the national, trained workforce necessary to produce the products and services that the global market requires. If we do not produce them, they will be produced elsewhere. A national, laser focus on science, math and engineering training is vital for the U.S. to continue leading the innovation economy.
Further, we must also have the tools to incent the future workforce to go into science, math and engineering. The Financial Accounting Standards Board (FASB), overseen by the Securities and Exchange Commission (SEC), has issued a final rule to require companies to expense stock options – a vital component of what helped build Cisco Systems and other innovative companies around the nation. Without the appropriate tools to build companies in the U.S., it becomes increasingly difficult to compete.

We also must have the appropriate physical infrastructure in the form of ubiquitous, true broadband. We must have a date certain for the transition to digital television to free up the spectrum for public safety uses as well as for rural broadband.

Finally, we must have a legal framework that incents innovation and a patent system that protects the work of inventors while not creating a system that is so overly litigious to the point of being fruitless to innovation. Patent legislation before the Congress should be passed this session.

Thank you.